Worksheet: Exponential growth and decay
Mr. Chvatal   **Name:**_____ **Class:**_____

Please read all instructions carefully and box your answers.

Determine the multiplier.

1.   5% growth   2.   12% decay

3.   30% growth   4.   98% decay

5.   .0017% decay   6.   400% growth

7.   doubling   8.   quadrupling

Simple growth and decay

9.   E. coli bacteria double in population every thirty minutes. If the initial population
       is 85, what's the population of bacteria after three hours? After one day?

10.   A cup of coffee contains about 100 mg of caffeine. Every hour 16% of the
       amount of caffeine is metabolized and eliminated.

       a.   Write an equation for C, the amount of caffeine in the body as a function
              of t, the number of hours since the coffee was consumed.

       b.   How much caffeine is in the body after five hours, to the nearest
              hundredth of a milligram? After a day?

11.   A serial killer is stalking the residents of Gloomy Falls, Mass., population 937.
       Every year the population diminishes by 4.5%. How many residents are left after
       the killer's three-year rampage? HOW WILL YOU STOP HIM?

12.   You bought a Boston Whaler in 2004 for $12,500. The boat's value depreciates
       by 7% a year. How much is the boat worth now? What will it be worth in 2020?

Compound growth and decay

13.   You invest $7000 in an account bearing 5% interest for ten years.

       a.   How much will the account be worth if compounded quarterly? What
             about monthly? Daily?

       b.   What do you notice about the amount of additional money you make as
             the frequency of compounding increases?

14.   You invest $10,000 in a private equity fund promising a return of 11%
       compounded annually. Use your calculator to try and find out how many years it
       will take to double your money.